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UNIVERSITY OF ILLINOIS

CIRCULAR OF INFORMATION

OF THE

DEPARTMENT OF CHEMISTRY

PUBLISHED BY THE UNIVERSITY OF ILLIN
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THE REGISTRAR,
Urbana, Illinois.

UNIVERSITY OF ILLINOIS

DEPARTMENT OF CHEMISTRY

History, Equipment, Members of the Faculty, Students and Announcement of Courses for the Year 1916-1917

The Cosmic Elements
Basil Valentine

Published by the University of Illinois
URBANA

CONTENTS

THE UNIVERSITY CALENDAR

1916

Jan. 3, Monday, 12 m.	Instruction resumed
Jan. 27, Thursday	Semester examinations begun
Feb. 3, Thursday	Semester examinations ended

SECOND SEMESTER, 1915-1916

Feb. 7, 8, Monday, Tuesday	Registration days
Feb. 9, Wednesday	Instruction begun
Feb. 12, Saturday	Lincoln Day
March 31 to April 3	Chemistry inspection trip
April 18-21, Tuesday-Friday	Spring meeting of American Chemical Society
April 19, Wednesday	Dedication of Chemistry Building
April 20, Thursday, 12 m.	Easter recess begun
April 25, Tuesday, 12 m.	Instruction resumed
May 13, Saturday, 12 m.	Latest day for the receipt by the Dean of the Graduate School of certified copies of doctors' theses.
June 1, Thursday, 8 a. m.	Final examinations begun
12 m.	Latest day for acceptance of undergraduate theses.
June 3, Saturday, 12 m.	Latest day for receipt by the Dean of the Graduate School of certified copies of masters' theses.
June 8, Thursday	Final examinations ended.
June 11, Sunday	Baccalaureate address
June 14, Wednesday	Forty-fifth Annual Commencement.

SUMMER SESSION, 1916

June 19, Monday	Registration day
June 20, Tuesday	Instruction begun
Aug. 10, 11, Thursday, Friday	Final examinations.

FIRST SEMESTER, 1916-1917

Sept. 18, 19, Monday, Tuesday	Registration days
Sept. 20, Wednesday	Instruction begun
Nov. 6, Monday, 5 p. m.	Latest day for announcement of subjects of all undergraduate and graduate theses.
Nov. 17-19, Friday to Sunday	Annual home-coming
Nov. 29, Wednesday, 12 m.	Thanksgiving recess begun
Dec. 4, Monday, 1 p. m.	Instruction resumed
Dec. 21, Thursday, 11 a. m.	Holiday recess begun
Jan. 3, 1917, Wednesday, 1 p. m.	Instruction resumed
Jan. 25, Thursday	Semester examinations begun
Feb. 1, Thursday	Semester examinations ended

SECOND SEMESTER, 1916-1917

Feb. 5, 6, Monday, Tuesday	Registration days
Feb. 7, Wednesday, 8 a. m.	Instruction begun
Feb. 12, Monday	Lincoln Day
April 5, Thursday, 12 m.	Easter recess begun
April 10, Tuesday, 12 m.	Instruction resumed
May 12, Saturday, 12 m.	Latest day for receipt by Dean of the Graduate School of certified copies of doctors' theses.
May 31, Thursday	Final examinations begun
June 7, Sunday	Baccalaureate address
June 13, Wednesday	Forty-sixth Annual Commencement

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	TERM EXPIRES
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DEPARTMENT OF CHEMISTRY

WILLIAM ALBERT NOYES, PH.D., LL.D., *Director of the Chemical Laboratory and Professor of Chemistry.*

THE FIRST BUILDING AT THE UNIVERSITY, REAR VIEW

The Department of Chemistry began its existence in the basement of the rear wing of this building. From a photo taken about 1875.

THE CHEMICAL LIBRARY AS IT APPEARED IN NOVEMBER, 1892

This was the first departmental library established at the University. Only the most frequently used reference works were kept here. Photo by W. E. Tower, '94.

INSTRUCTIONAL STAFF

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HECKER, CHARLES HENRY, CH.E. 1909, A.M. 1911, PH.D. 1913, Univ. of Cincinnati. Instructor in Chemistry. 904 W. Green (U.).

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†Resigned February 1, 1916.

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BRALEY, SILAS ALONZO, A.B. Morningside Coll., 1913; M.S. Univ. of Ill., 1915. Assistant in Chemistry. 806 S. Third St. (C.).

TIPPET, RALPH WALDO, A.B. Lawrence Coll., 1913; A.M. Univ. of Ill., 1915. Assistant in Chemistry. 917 W. Green (U.).

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WESTHAFER, TERRENCE ONAS, A.B. Univ. of Okla., 1914. Assistant in Chemistry. 407 W. Healey (C.).

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OWENS, ALBERT WAFFLE, B.S. Bucknell Univ., 1909. Assistant in Chemistry. 504 Chalmers St. (C.).

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VAN WINKLE, WILLIAM ALEXANDER, B.S. Univ. of Mich., 1911. Assistant in Chemistry. 808 W. Illinois (U.).

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*Resigned December 1, 1915.

HICKS, JOHN FREDERICK GROSS, B.S. Univ. of Pa., 1906. Assistant in Chemistry. 307 W. High (U.).

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†Died January 3, 1916.

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HART, LIZA, Stenographer, State Water Survey. 515 Neil St. (C.).

DAY, NELLE, Stenographer, State Water Survey. 806 W. Stoughton St. (C.).

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ZELLE, CARL A., Student Assistant. 917 W. Green St. (U.).

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KLOTZCHE, BERNARD T., Laboratory Helper (Student). 1003 W. California St. (U.).

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MOON, CECIL, Laboratory Assistant, State Water Survey.

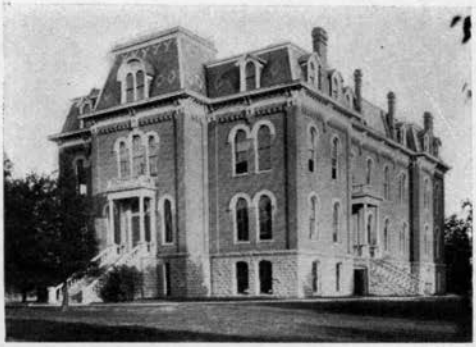
MOODY, D. L., Janitor. 405 E. Daniel St. (C.).

PERRY, FRANK M., Janitor. 504 E. Healey St. (C.).

BROWNING, JOHN EDWARD, Night Janitor. 1202 W. Clark St. (U.).

ROE, JOHN, Messenger. 201½ E. Park St. (C.).

*Resigned January 1, 1916.



HOME OF THE DEPARTMENT OF CHEMISTRY FROM 1878 TO 1902
PHOTO BY S. W. STRATTON, '84

THE CHEMICAL LABORATORY AS IT APPEARED SOON AFTER ITS ERECTION IN 1902. PHOTO BY S. W. PARR, '84

HISTORICAL SKETCH OF THE CHEMISTRY DEPARTMENT

By Professor S. W. Parr

The inaugural ceremonies and formal opening of the University of Illinois* occurred March 11th, 1868. The Board of Trustees met on that date and received the first annual report of the Regent (President) of the University. In this report occurs the first reference to chemical work in the institution, as follows: "It is especially important that an appropriation should be made to fit up, at once, a chemical laboratory." At the same meeting of the Board, on recommendation of the Regent, it was voted to appoint Professor J. A. Sewall of the Illinois State Normal University, Normal, Illinois, to the chair of Chemistry. Dr. Sewall declined the appointment. His only connection with the University was to deliver the first annual address before the Literary Societies in June of that year. The records do not give any of the details from which we might surmise the reasons for his withdrawal. However, the State Normal, founded in 1857, had a remarkably strong faculty, was an exceedingly popular institution, and occupied a leading place in the educational work of the state. Moreover the environment was attractive, thanks to a public spirited citizen who had planted trees by the thousand over most of the area likely to be occupied by the new town of Normal, so that it was rapidly assuming the appearance of a park or forest.

The Urbana-Champaign institution, on the contrary, was located on a most uninviting strip of flat open prairie one mile from either town; it was to inaugurate a novel and untried educational program, the published announcement of which had already awakened more antagonism than support and the students in attendance at the time numbered seventy-seven.

It may be remarked, in passing, that the writer of this sketch obtained his first chemical experience in Dr. Sewall's laboratory. In the capacity of the ubiquitous small boy with perhaps overgrown curiosity, he was watching some advanced students assemble a hydrogen generator. For some reason, not altogether clear at this remote date, but which would not be difficult to surmise, the outfit exploded with a liberal distribution of acid upon everything in the

*Originally the Illinois Industrial University, until changed by Act of the Legislature, June, 1886.

neighborhood. There were no permanent injuries except to clothing. The coat, which was a new one, had to be worn just the same in spite of the leopard spots. This might be designated as an early experience in applied chemistry.

In August, 1868, there was better success, as indicated by the following extract from the minutes of the Board:

"Professor Sewall having declined the appointment tendered him to the Chair of Chemistry, the committee, under authority given by the Board, secured the services of Prof. A. P. S. Stuart, late of Lawrence Scientific School, Harvard University, and now recommend Prof Stuart to the Board for permanent appointment to the chair of Chemistry."

The following action further appears upon the minutes of the Board under date of Nov. 18th, 1868:

"That Prof. A. P. S. Stuart be and is hereby elected to the chair of Chemistry at a salary of $2,000 per annum to take effect from and after September 1st, 1868."

In the minutes of the Board for March 12, 1869, containing the second annual report of the Regent, it appears that the initial cost for equipping the laboratory was $978.00. There was submitted also by Professor Stuart a plan of compensation for chemicals used by the students. Since the provisions therein embodied contain many features which have been of fundamental importance in the development of the department they are given somewhat in detail as follows:

"For a course of two hours daily, excepting Saturday, during a term of twelve weeks the sum of $12 shall be deposited by each student. For a course occupying four hours daily the sum deposited shall be $24, and for a course of six hours the sum deposited shall be $36. An account shall be kept by the Professor of Chemistry with each student; all articles shall be charged to him at cost and a credit entered for all articles returned in good condition, except that a charge of 20 per cent of the cost shall be made for the use of same. Such percentage, however, shall not exceed $3 for the term. Students shall pay the cost value of the apparatus broken or destroyed by them individually."

Further:

"All money received from students for chemicals and apparatus shall constitute a distinct fund from which the Professor of Chemistry may draw to purchase supplies from time to time as occasion may require."

In the budget presented to the Legislature in 1869, an asking of $30,000.00 appears with the result that $5,000.00 was appropriated.

With the revenue thus provided the first laboratory was equipped and operated. It was located in the basement of the south wing of the original University building. This building, shown in the accompanying cut, occupied the space now taken by the base ball diamond at the north end of the athletic field. It fronted northward on University Avenue.

The need for more room developed at an early date. In his annual report for March, 1871, the Regent, referring to Legislative action, says:

"An appropriation of $50,000 was asked for a laboratory building. Other needs compelled a denial of the request. This is the more to be regretted because long before a suitable building can be erected the department will have utterly outgrown its accommodations. It may be found wise to prepare temporary quarters for it in the basement or some other part of the new building."

The "new building" referred to was the present University Hall, then in process of erection.

At the annual meeting of the Board, March, 1872, the Regent in his report refers to the "College of Chemistry" and urges that the agricultural interests and the size of the University require that a chair of Agricultural chemistry be established, which should be filled before the next year. He again calls attention to the need of more room thus:

"Our laboratory, wholly insufficient for a University of this character, has tables for thirty-four students to work at once. It has this year been crowded to the overflow, two sets of students succeeding each other at the same tables. The number of students specializing is not large—fourteen—but other calls will increase the demand. * * * It will be necessary to transfer the laboratory to the basement of the new building until a new one can be built."

The equipment of the laboratory had been materially increased as a result of a trip to Europe by Professor Stuart during the summer of 1871 for the purpose of selecting in person the apparatus desired. The list of accessions is interesting. One item of interest was a platinum retort for making hydrofluoric acid, weighing 1,000 grams, and costing $200.00. Included in the somewhat formidable list of gas apparatus, polarizers, saccharometers, goniometers, a Geisler's mercurial air pump, etc., were "two chemical balances of short beam type peculiar for their rapidity and accuracy of operation" and a Ross photographic lens listed at $100.00.

Professor Stuart continued to the end of the year 1873-4. The

Regent, notwithstanding his persistent efforts, had been unable to secure an appropriation for a new laboratory and was definitely planning, as the only alternative, to set aside more liberal quarters in the new University Hall. This was not acceptable to Professor Stuart and he resigned. His withdrawal doubtless hastened the securing of the new building.

Very little remains today of this early equipment. Two of the desks transferred from the original laboratory to the basement of the new building (the present law college) were moved a second time and now adorn the north end of what is known as Dr. McFarland's junk room. The Geisler air pump is a nearby companion of the old desks. The fine photographic lens is in the photographic department where, in comparison with modern lenses, it is reckoned as worth at least its weight in brass. The platinum retort was exchanged in 1903 for about $800.00 worth of much needed platinum dishes. Many of the original sets of reagent bottles remain in service today, but practically all of the other apparatus, including the "peculiar" short beam balances, were destroyed in the fire of August 15th, 1896.

One feature of Professor Stuart's administration should receive special mention. The journals and books of reference added to the library were well selected and gave to this department a distinction which it has consistently maintained. The list at this early date included the Annalen, Jahresbericht, Dingler's Polytechnisches Journal, The Handwoerterbuch der Chemie, Silliman's Journal, The American Chemist, The American Journal of Science, Berichte, Comptes Rendus, Journal of the Franklin Institute, the Philosophical Magazine, Watt's Dictionary of Chemistry, etc., etc. The University library was located on the floor immediately above the chemical laboratory in the south wing of the original building.

Professor Stuart was a student under J. P. Cooke at Harvard, with whom he was serving as an assistant in 1868. He had spent the previous year in study abroad. The laboratory at Harvard was one of the earliest in this country to be organized for student work, and that the new instructor brought with him enthusiasm for the same method of instruction is evident when we note the obstacles to be overcome. The only water available was from the college pump. There was no city gas supply and electricity by the meter route was of course unknown. A kitchen stove was installed in the laboratory and this was the only source of heat.

Whether it may be taken as an index of the low cost of living or the economical propensities of the professor is not stated, but it used to be remarked about the campus that he came at a salary of $2,000.00 per year, staid five years and took away $10,000.00 with which to start a banking business in the west. However, he was unmarried and lived in the building in a sort of supervisory capacity.*

Henry A. Weber was appointed Professor of Chemistry September 1st, 1874, and served until June, 1882. He had studied under Liebig at Munich and received his Doctor's degree from Ohio State University in 1879. He had been chemist to the Ohio Geological Survey since 1869.

Dr. Manly Miles served as Professor of Agriculture and Instructor in Agricultural Chemistry for one year—1875-6. In 1876, M. A. Scovell, B.S. in Chemistry, Illinois, '78, was elected Assistant Professor of Chemistry and had in charge the courses in Agricultural Chemistry. In 1880 he was made Professor of Agricultural Chemistry, which chair he held until 1882.

The appropriation for the new Chemical Laboratory was secured early in 1877 and amounted to $40,000.00. Plans for the building were prepared by Professor Ricker and approved by the Board at the March meeting, 1877. The architect in his plans had in mind a location on the north side of Green street, about where Engineering Hall is now situated. As has occurred on numerous occasions since, a very positive division arose in the Board as to the most suitable location. This point was not settled until the September meeting. Meanwhile bids had been called for and these referred of course to the plans as originally drawn. Since the building was completed and occupied in the spring term of that same year, it is evident that no time was spent in disturbing the original plans. These called for a main entrance at each end of the building, but in the new location the north entrance was too inconvenient for use and the south entrance led only to the janitor's garden. Neither entrance was ever opened. The basement entrance on the west side was utilized and after some years the south entrance was moved around to the west side. Unfortunately this pleasing bit of architectural effect is now lost from both the side and end of the building.

City gas was available and water under pressure was provided from a large steel tank supported in the mansard story and kept supplied by a pump in the basement. The source of supply came from a well. Two cisterns were available when the well went dry.

*Professor Stuart died at Lincoln, Neb., in 1895.

They were replenished from the laboratory down spouts and are still in commission.

The Board voted an assignment of $125.00 as a sort of honorarium to the architect. This would seem to be reckoned on a basis of about 0.3 of one per cent. Doubtless the fixing of architects' fees has not been left permanently with the Board.

The method of instruction followed by Professor Weber was quite German in character. Laboratory work began with qualitative analysis. The work in elementary chemistry consisted of lectures and recitations only. There were no recitations in any of the courses following the elementary text. It was said of the department at this time that in it one could attain to the very highest or the very lowest stage of chemical knowledge, depending entirely upon the zeal of the student. The grades turned in were much the same for either type. As a natural result the department became attractive to many students who could not make things go in other lines of work.

An unfortunate disagreement with the Board in 1882 resulted in the withdrawal of both Professors. It does not appear that the circumstances attending the termination of their appointment affected in any degree their subsequent careers. Dr. Weber was engaged from 1882 to 1884 as Superintendent and Director of a large establishment for the manufacture of sugar from sorghum, located at Champaign, and was Professor of Agricultural Chemistry at Ohio State University, Columbus, from 1884 until his death in 1912. Professor Scovell was the exceedingly successful and highly esteemed Director of the Kentucky Agricultural Experiment Station from 1885, and also Dean of the College of Agriculture from 1909 until his death in 1912. It may be of interest to note that he was offered the same appointment at Illinois in 1894 but he chose to remain at the University of Kentucky.

Professor William McMurtrie was appointed head of the department September, 1882. The position of Professor of Agricultural Chemistry was not revived. The funds of the institution seemed not to warrant any expenditure that could possibly be avoided. This may be inferred from the fact that the total legislative appropriation for the biennium 1881-83 was only $41,300.00, or approximately $20,000.00 per year, and of this only $5,700 per year was designated as for instruction.

Professor McMurtrie graduated from Lafayette College in

1871. His experience and training had been largely along Agricultural lines. He was assistant chemist in the U. S. Agricultural Department in 1872 and chief chemist in 1873. He was designated as Agent and Special Representative of the Government at the Paris Exposition in 1878 and Special Agent of the Agricultural Department in the study abroad of the beet sugar industry. He served thus in the capacity of "Agricultural Technologist" for the Government until the time of his appointment here in 1882. Dr. McMurtrie was a strict disciplinarian and he at once set about establishing for the department a more exacting standard of accomplishment. The text-book used was the abridged work of Roscoe and Schorlemmer, and his first assignment to the beginning class in general chemistry was to commit to memory without skip or flaw the list of elements from aluminum to zirconium. His first assistant was Howard Slauson, a graduate of the department in 1882, and his second assistant was a senior, A. W. Palmer. In addition to the regular chemical work the course in mineralogy was given by the chemical department.

Dr. Palmer, who withdrew in 1884, returned from study at Harvard, where he received his Doctor's degree, in 1886. He was given the same official title as when he went away, that of First Assistant in Chemistry. It was largely through his influence that the work for beginners was changed from qualitative analysis to experimental laboratory exercises in general chemistry. Everyone connected with the department appreciated the remarkable ability of Dr. Palmer, both as related to his wide and accurate knowledge of chemical detail and in the matter of effectiveness as an instructor. When Professor McMurtrie resigned, therefore, in 1888, to become the Chief Chemist for the Royal Baking Powder Company, his logical successor in the department was Dr. Palmer, but for some reason, possibly because of his very youthful appearance, he was not appointed. This fact, together with the meagre recognition accorded him for the two years previous in the matter of advancement in title, were doubtless large factors in causing Dr. Palmer also to resign and go abroad for study.

The year opened in September, 1888, with Dr. J. C. Jackson as Professor of Chemistry. The Agricultural Experiment Station had just been organized with the Chemical laboratory for the station installed on the top floor of the Chemistry building. Dr. A. G. Manns was in charge and H. S. Grindley, Assistant. Dr. Manns

had graduated from the department in 1885, studied abroad and received his Doctor's degree at Berlin in 1888. The work of Professor Jackson was far from successful. Indeed, the affairs of the department were so rapidly approaching a state of chaos that he withdrew December 31st, 1888, and Dr. Manns was asked to conduct the classes for the remainder of the year. Dr. Palmer was communicated with by cable, the result being that he resumed his work again September, 1889, as Assistant Professor of Chemistry. He was advanced to a full Professorship at the end of the first year.

While abroad Dr. Palmer studied first at Göttingen, where, by reason of the overcrowded condition of the laboratory and, doubtless also, because of strong recommendations from Harvard, he was given a place in Victor Meyer's private laboratory. He studied later under Hofmann at Berlin, where he began his work on the arsines which culminated three years after his return to Illinois in establishing the existence of that series.

It should be noted that at this time a new life and altogether different aspect of affairs were in evidence at the University. The most potent factors were doubtless the change in name from the "Industrial" University to the "University of Illinois" in 1885, and the increased revenue from the action of the federal government in the Hatch Act of 1887 and later in the Morrill Land-College Aid Act of 1890. These two measures were to augment the revenues at the outset by over $30,000.00 annually. This was a relatively large sum since the total state appropriation for the year 1889-90 was only $31,750, of which $16,000 was designated as for "expenses and instruction." The total state appropriation for the biennium 1889-91 was $59,000.00.

The attendance during the year 1889-90 reached 469—including the Preparatory students—and in the following year, 1890-91, passed the 500 mark. Under date of March 6th, 1890, Dr. Palmer, because of the greater number of students in attendance, asked that the Board increase the assignment of funds for the importation of chemicals and apparatus from $650.00 to $1,000.00. This was granted.

Parallel with the increase of students was a new policy of arranging class exercises in connection with all courses, either in the form of lectures or quizzes. All this, together with the course in mineralogy, called for an actual teaching schedule of about 8 hours per day for Dr. Palmer, the two assistants being called upon for an equally heavy schedule in supervision of the laboratory work. The

need for more help was obvious. Since 1882 the teaching force had consisted of a Professor, a first assistant who was usually a recent graduate from the department, and a second assistant who was a chemical senior. The first provision for increasing the staff is indicated in the minutes of the Board for Dec. 9, 1890, where it is recorded that S. W. Parr was

> "Appointed to the Chair of Analytical Chemistry * * * the division of labor between him and Professor Palmer, already in the service of the University in the department of Chemistry, being left for subsequent arrangement."

The appointment was ordered to take effect the first of January, 1891.

No formulation of the arrangement which seemed best fitted to indicate the division of labor was made for several years. At the August, 1894, meeting of the Board, however, the following record is entered:

> "It is recommended that Professor Palmer be charged with the general business affairs of the Chemical laboratory and that Professor Parr's title be changed from that of Professor of Analytical Chemistry to that of Professor of Applied Chemistry and that their departments be separately organized as agreed upon between themselves."

It was thought that by thus organizing a distinct department for studying the industrial problems and conducting special courses in technological subjects, more importance would seem to be accorded such work and a better recognition of it on the part of the authorities would result. Especially was it hoped that in the assignment of funds, the needs of such a department would be recognized. It is difficult to appreciate at the present time the insistent demands which then existed on the part of all the departments for funds. The institution was growing in numbers and needed equipment out of all proportion to the money available. By the device of a second, independent department, the assignment of library funds for books was practically doubled, but special appropriations for work in industrial chemistry were discouragingly meagre.

Simultaneously with the establishment of this second department of Chemistry the courses in Chemical Engineering were arranged and adopted as the prescribed schedule for the department of Applied Chemistry. The formulation of this course followed and was printed in the catalog for that year under the caption "Course in Applied Chemistry with Engineering Subjects." A two years' course in Pharmacy not leading to a degree was introduced in 1892, with W. E. Sanford appointed as second assistant in chemistry and

giving instruction in the pharmaceutical courses. In 1893-4 this was expanded to a four years' course in chemistry and pharmacy with the degree of B.S. A very complete pharmacy and prescription room was established on the third floor.

Two noteworthy improvements were introduced in 1892 in the working arrangements for the advanced students on the second floor. A new balance room was enclosed in the space between the central store-room and the east wall, and the balances there installed were enclosed in individual compartments with a counterpoise front which could be locked. Keys were given out to the men assigned to a balance. The balances were thus protected from dust and also from use by unauthorized persons. The cases were attractive in appearance and exceedingly satisfactory in operation. The other feature was the establishment after no little argument with the librarian, of a departmental library. The location given to it was the balance room and the shelving was constructed along the west wall. This was the first concession of the sort on the part of the library authorities and was the initiation of a system which has now become thoroughly established. At that time, however, the Professors drew out the desired books on their personal checks and returned everything to the main library at the end of the year. This balance room and departmental library as shown in the cut was located in the space now occupied by rooms Nos. 304 and 306 of the present law building.

An interesting event of this period was the starting of the Chemical Club. It was organized Nov. 22, 1892. Through the research propensities of Miss Sparks the membership roll for 1893-4 has been unearthed. It contains 20 names which might well be put in suitable form for preserving in the archives of the club. All four members of the instructional staff are in the list and every one of the student members later become graduates of the department.

In the fall of 1892 some relief from the heavy schedule of courses resulted from turning over the work in mineralogy to Professor Baldwin, head of the department of Mining Engineering. In the following year the collections and entire responsibility for the conducting of that work were transferred to the department of Geology.

The legislative session of 1895 allowed an item in the budget of $5,000 for the biennium following, which was designated, "For changes in the chemical laboratory," and which was understood to be for the inauguration of a State Water Survey. This work was

provided for, therefore, as indicated in the minutes of the Board for June 27, 1895, as follows:

> "From the special appropriation of $5,000.00 for changes in the chemical laboratory, which was intended to cover the expense of carrying on a systematic survey of the waters of the state."

—there is appropriated the sum of $2,750.00 for alteration, furniture, apparatus, and the services of a chemist. The work was at once inaugurated under Dr. Palmer's direction with Mr. C. V. Millar, B.S. in Chem. '93, M.S. in '94 as "Assistant in Chemistry on the State Water Survey."

In the spring term of 1899 the honorary chemical fraternity, Phi Lambda Upsilon, now grown to national status, was organized. The promoters and charter members were F. C. Koch, Horace Porter and P. Rudnick of '99, and Harry Hasson, "Artie" Johnston and E. B. Safford of '00.

In the early morning of Aug. 15, 1896, the laboratory was struck by lightning. The entire upper floor was burned. This included the Pharmacy, the Photographic rooms, the Museum and the laboratory of the Agricultural Experiment Station. On the second floor everything north of the central store room was burned. This included Dr. Palmer's private laboratory, with the result that many valuable papers and records were lost. The large steel tank near the roof had its supports burned away and it fell through to the basement, completely wrecking the two store rooms in its path. A new roof of different pattern was at once put on, but only such repairs and board partitions were provided as would make the interior usable temporarily, it being confidently expected that at the coming session of the legislature funds would be appropriated for making good the loss, with a new and larger building which the great increase of students made imperative. The outcome was $5,000 appropriated to replace apparatus lost in the fire.

The legislative session of 1897 was wholly favorable to a liberal appropriation for a new library, doubtless as greatly needed as a new chemical laboratory, and since two large buildings from one session were not to be thought of, the chemical interests stood aside, with the understanding that their turn would come next. But with the legislature of 1899 the psychological moment seemed to have arrived for obtaining a large main building for the Agricultural College and again the chemists lost out. In 1901, however, an appropriation of $100,000.00 was secured for the Chemistry Building. This amount was less than half of what the department considered

essential. The question to be decided, therefore, was whether to build one-half of the laboratory and equip the same for work, or to plan a building which would take care of the increase in students for the coming twenty-five years, but with very little in the way of equipment. If the first plan were followed it was absolutely certain that a second large appropriation would have to be asked for within ten years and the outlook for such a procedure was altogether discouraging. The other plan, therefore, was followed with the result that when the contract was let for the building there was only $800.00 left for equipment. This was sufficient to place four new desks in the Quantitative laboratory and supply a few hoods. Every desk in the old building was moved over. Many of these were marred from the effects of the fire and all were battle scarred from twenty years of strenuous use. It certainly was a distressing feature in making the new building ready for occupancy in the fall of 1902 to see these old wrecks hoisted by rope and tackle to the third story and skidded into place for service again with the Freshmen. Fortunately at the next session of the legislature, in 1903, an item of $20,000.00 was allowed under the designation of "material and equipment for the chemical laboratory." This item was repeated in the budget for a number of succeeding sessions and very materially relieved the situation. At least the departments were able to keep fairly abreast of the rapid increase in the number of students.

On February 2, 1904, occurred the death of Professor Palmer. He had been ill but a short time. The direction of the State Water Survey had brought on a tremendous amount of work and responsibility, especially in connection with the survey of the Illinois River before and after the opening of the Chicago Sanitary Canal. His second report covering the work from 1897 to 1902 and embodying the results of the Illinois River and Sanitary District Survey is a monument to his untiring industry and ability. He literal'y gave his life in the service of the University and the State.

Dr. H. S. Grindley, who had been appointed Assistant Professor of Chemistry in 1895 and Associate Professor in 1900, continued in charge of that department for the remainder of the year.

At the meeting of the Board for August, 1904, the following recommendation by the President was passed:

"(1) That the Department of Applied Chemistry be discontinued as such and that there be one Department of Chemistry. (2) That Professor Parr's

title be continued as that of Professor of Applied Chemistry and Associate Professor Grindley be made Professor of General Chemistry. (3) That the headship of the department be divided so that Professor Parr shall have general charge of all matters pertaining to instructors and instruction, and Professor Grindley as Directory of Laboratory shall have charge of and be responsible for all business and material affairs. They will then so adjust matters that each shall have supervision over definite subordinates and courses of instruction, and each be directly responsible for the men and work so assigned."

From September, 1904, therefore, the consolidation of the two departments was effected and the work carried on as above ordered until the appointment of Dr. W. A. Noyes as "Professor of Chemistry and Director of the Laboratory" beginning September 1, 1907. At the same time Dr. Grindley was appointed chief in Animal Chemistry in the Agricultural Experiment Station and Professor of Animal Chemistry in the College of Agriculture. The State Water Survey was put under the supervision of Professor Parr in February, 1904, and so continued until the appointment of Professor Edward Bartow, September 1, 1905.

The Illinois section of the American Chemical Society was organized April 24, 1906, with twenty-six members. At the present time there are 152 members of the section and all but thirty-seven are connected with the University.

In April, 1908, the Zeta Chapter of the National Chemical Fraternity, Alpha Chi Sigma, was installed.

The new building entered in 1902 soon became crowded to such an extent that distress signals were in evidence even when only one-half of the estimated time of twenty-five years had passed in which it was assumed there would be ample room. Indeed, the need for an addition to the building was urged upon the legislative session for 1913. The addition to the University fund from the mill tax, available after July 1, 1913, made it possible to proceed with the plans for the new addition and the contract was let August 14, 1914.

In this brief review it is of interest to note that the number of students specializing in chemistry has grown from 14 in 1872 to 245 in 1915, of whom 75 are in the graduate division.

We may infer also from the regent's report of 1872 that about sixty-eight students from all departments constituted the general enrollment in chemistry. The total registration in all courses in the department for this first semester 1915-16 is 2,146.

The instructional force from 1869 to 1874 numbered one. From 1876 to 1882 there were four members on the staff. From 1882 to

1890 there were three. In 1902 at the time of entering the new building there were fifteen. For the current year 1915-16 the number is sixty-two.

In 1890 the assignment for the importation order, based in the main on the estimated laboratory deposits from students for the year to follow, was increased from $650.00, the former amount, to $1,000.00. The corresponding assignment for recent years has been $10,000.00 annually.

After the organization of the Graduate School at the University in 1895, the first examination for a Doctorate was in the Chemistry department, Dr. W. H. Dehn now of the University of Washington, having that distinction. He received his degree in 1903. The degrees of this order from the department last year were six. The prospective candidates for 1916 number fourteen.

In the matter of publications, for the year ending April 30, 1915, the output from the department numbered thirty-five titles, two of them being books.

It has been the purpose of this sketch to give the larger place to details connected with the early development of chemical work at the University. The events of the current years are familiar and can be better set forth in their proper relation when they, too, have become history.

DEPARTMENTAL DIVISIONS

For convenience in administration, the department is at present organized under the following divisions:

General Inorganic Chemistry and Qualitative Analysis.
Quantitative Analysis, including Agricultural and Food Analysis
Organic Chemistry.
Physiological Chemistry.
Animal Nutrition.
Physical Chemistry, including Electrochemistry.
Industrial Chemistry, including Metallurgy, Assaying and Gas Analysis.
Sanitary Chemistry, including Water Analysis.

AIMS OF THE DEPARTMENT

The Department of Chemistry serves the need of several distinct classes of students.

Chemistry touches modern life in such a great variety of ways that no one can be considered as having a satisfactory liberal education without some knowledge of the elementary principles of the science. The exercises in the laboratory also furnish excellent training in manipulation and in the co-ordination of observation with knowledge acquired from lectures and the textbook. The work in qualitative analysis during the second semester of the first year's work in chemistry gives a training in the study of logically connected relations scarcely equalled in any other branch of science. This gives a mental discipline fully parallel to that secured by the study of language or of mathematics.

Students of engineering, agriculture and household science require some knowledge of chemistry as an almost indispensable adjunct to their work.

The undergraduate courses leading to the degrees of Bachelor of Science in chemistry and in chemical engineering furnish professional training parallel to that given by courses in engineering or in agriculture. The demand for men with training of this kind has been such that nearly all of the graduates of these courses during recent years have found positions in industrial establishments immediately on graduation.

The statistics of the Universities of the country show that a larger number of students go on to the advanced degree of Doctor of Philosophy in Chemistry than in any other science. This is largely due to the fact that many industrial positions call for men with thorough training and the most important advances now being made in the application of chemistry in the arts rest on principles which can only be understood by those who are familiar with methods of research. The best positions open to teachers of chemistry also require the training which is indicated by an advanced degree. These conditions have led to a very rapid increase in the number of graduate students of chemistry at the University.

Chemistry is pre-eminently a science which is undergoing very rapid changes and developments. No University is worthy of the name, which does not contribute each year something toward this development. A very considerable part of the time and energy of the teaching staff ought to be spent on research work and there is

a much closer connection between effective teaching and productive research than is sometimes supposed.

The chemists of the world have long known that Germany has won a position far in advance of other nations in many lines of chemical manufacture, and that this pre-eminence is directly connected with those methods of training men for independent chemical research which were first developed and which have attained their best expression in German laboratories. The sudden exclusion of German products from our markets by the war has opened the eyes of the whole country to our inferior and dependent position in many lines of chemical manufacture and to the importance of establishing such industries on a better footing in America. It is the chemical laboratories that are most active in research which will furnish the trained chemists who are capable of meeting this new demand.

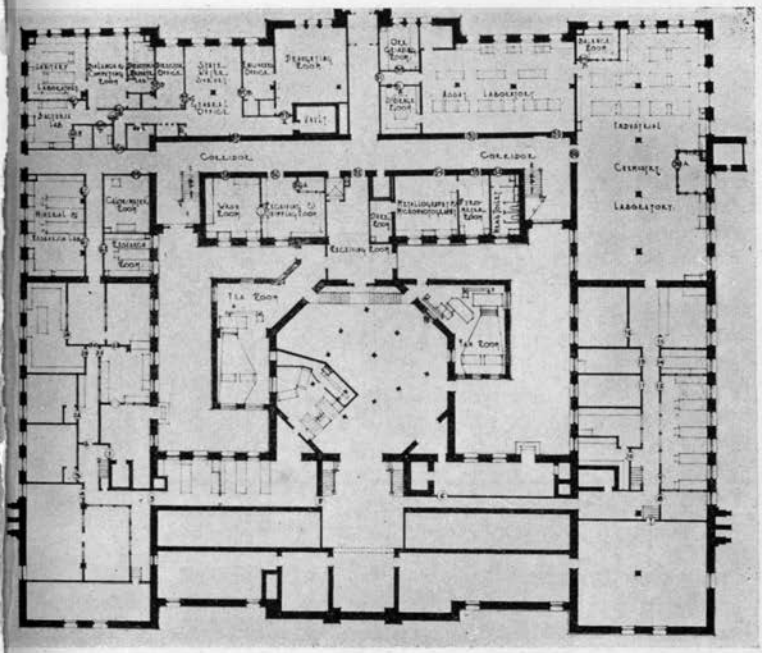
The teaching staff of the Department for 1915-16 includes 5 professors, 4 assistant professors, 4 associates, 8 instructors, 20 assistants, and 23 graduate assistants. There are also 2 graduate scholars, 5 fellows, and 2 research assistants of whom no teaching is expected.

THE CHEMICAL LABORATORY

The building erected in 1901-2 as a home for the Department of Chemistry resembled the letter "E" in shape, the extreme dimensions being 230 feet along the front and 116 feet along the wings. This building contained 77,884 square feet of usable space, which it was estimated would provide ample room for the needs of the department for at least 25 years. The growth has been so rapid that in 1914 work was begun upon an addition which has a larger capacity than the original building. The cost of the addition is more than double that of the original building. The completed building is in the form of a hollow square, 231 feet by 202 feet, containing 164,28 square feet of working space. The center is occupied by the main lecture room, which is lighted by a skylight; two large ventilation fans are housed in the court, which arrangement prevents annoyance from noise and vibration.

The old portion of the building is not fire proof, but is divided into three sections by fire walls, while the new part is built of fire proof material. The floors are a combination of reinforced concrete joists and hollow tile, the concrete covering the tile to a depth of 2 inches. Upon the concrete the electrical conduits are laid and these are covered with a top layer of concrete, rubbed to a smooth surface

THE CHEMICAL LABORATORY COMPLETED 1916



GROUND FLOOR

STATE WATER SURVEY, INDUSTRIAL CHEMISTRY, VENTILATION SYSTEM

The top surface consists of a layer of "rezilite mastic" about one-eighth of an inch in thickness. This is a preparation of Elaterite, containing some asbestos fibre, which gives elasticity to the floor, and is superior to asphalt because it does not yield under the pressure of heavy furniture. The floors in the halls have the Terrazzo finish.

The roof is constructed of concrete slabs which are covered with wood sheeting, building paper and slate. The purpose of the wood sheeting is to give an air space for insulation purposes and to furnish a better means of laying the slate. Being entirely covered on all sides by fire proof material the sheeting does not increase the fire risk.

The minor partitions are made of "pyrobar" tile. A brick wall